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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,541	07/22/2003	Tsuyoshi Shibata	01272.020609.	4875

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EXAMINER	
HUFFMAN, JULIAN D	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,541	SHIBATA ET AL.	
	Examiner	Art Unit	
	Julian D. Huffman	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 22 July 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 1/26/04
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1 and 22 are objected to because of the following informalities:

Line 4 of claim 1 is unclear.

Lines 3-5 of claim 22 are unclear.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 7-9, 11-14, 18-20 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. 6,481,816 B1 to Oyen.

Oyen discloses an inkjet (column 4, lines 4-5) printing method using a printing head (fig. 1, element 3) having a plurality of nozzles (7) capable of ejecting ink for printing an image by ejecting ink based on printing data which instructing ejection or non-ejection of ink, wherein

said printing data corresponding to an abnormal nozzle malfunctioning in

ink-ejection is added to the printing data corresponding to a neighboring nozzle of the abnormal nozzle (abstract).

With regards to claim 2, said plurality of nozzles are aligned next to each other along a predetermined direction (fig. 1); and

when an N-th nozzle of the plurality of nozzles is an abnormal nozzle, the printing data corresponding to the abnormal nozzle is added to at least one of the printing data corresponding to an (N-M) th neighboring nozzle and an (N+M) th neighboring nozzle (where N and M are positive integers) arranged in the neighborhood of the N-th abnormal nozzle (figs. 5a-5d, column 6, lines 2-25).

With regards to claim 3, said plurality of nozzles are aligned next to each other along a predetermined direction (fig. 1); and

when an N-th nozzle of the plurality of nozzles is an abnormal nozzle, the printing data corresponding to the abnormal nozzle is added to at least one of the printing data corresponding to an (N-1) th neighboring nozzle and an (N+1) th neighboring nozzle (where N is a positive integer) arranged in the neighborhood of the N-th abnormal nozzle (column 6, lines 2-3, fig. 1 and figs. 5).

With regards to claim 7, Oyen discloses that when the printing data corresponding to the abnormal nozzle is added to that corresponding to the neighboring nozzle, a printing resolution of the printing head is improved (compare figs. 5b and 5c, wherein resolution is improved when compared to the image that would be printed without correction).

With regards to claim 8, Oyen discloses that an image is completely printed in a predetermined area of the printing medium by a single movement of the printing head relative to the printing medium while ink is being ejected out of the nozzle of the printing head based on the printing data (column 2, lines 32-42).

With regards to claim 9, Oyen discloses that an image is completely printed in a predetermined area of the printing medium by moving a single movement of a single printing head relative to the printing medium while ink is being ejected from nozzle of the single printing head based on the printing data (column 2, lines 32-42).

With regards to claim 11, Oyen discloses the further steps of:

printing a detection pattern on a printing medium by using the printing head for detecting the state of the nozzle ; and

detecting the abnormal nozzle based on the detection pattern printed on the printing medium (column 8, lines 38-45).

With regards to claim 12, Oyen discloses an inkjet printing apparatus (column 4, lines 4-5) for printing an image by use of a printing head (3) having a plurality of nozzles (7) capable of ejecting ink and by ejecting ink out of the nozzles based on printing data which instructing ejection or non-ejection of ink, comprising

compensation means for adding the printing data corresponding to an abnormal nozzle in ink ejection state to the printing data corresponding to a neighboring nozzle arranged in the neighborhood of the abnormal nozzle (element 12, which performs the claimed function as described in the abstract and column 5, lines 1-7).

With regards to claim 13, Oyen discloses that said plurality of nozzles are aligned next to each other along a predetermined direction (fig. 1); and

said compensation means performs a compensation process in which when an N-th nozzle of the plurality of nozzles is an abnormal nozzle, the printing data corresponding to the abnormal nozzle is added to at least one of the printing data corresponding to an (N-M) th neighboring nozzle and an (N+M) th neighboring nozzle (where N and M are positive integers) arranged in the neighborhood of the N-th abnormal nozzle (column 6, lines 2-25, compare figs. 5c and 5a).

With regards to claim 14, Oyen discloses that said plurality of nozzles are aligned next to each other along a predetermined direction (fig. 1); and

said compensation means performs a compensation process in which when an N-th nozzle of the plurality of nozzles is an abnormal nozzle, the printing data corresponding to the abnormal nozzle is added to at least one of the printing data corresponding to an (N-1) th neighboring nozzle and an (N+1) th neighboring nozzle (where N is a positive integer) arranged in the neighborhood of the N-th abnormal nozzle (column 6, lines 2-25, compare figs. 5c and 5a).

With regards to claim 18, Oyen discloses means for improving a printing resolution of the printing head when the printing data corresponding to the abnormal nozzle is added to that corresponding to the neighboring nozzle (element 12, which improves resolution as seen in a comparison between figs. 5b and 5c).

With regards to claim 19, Oyen discloses means for completely printing an image in a predetermined area on the printing medium by a single movement of the printing head relative to the printing medium while ink is being ejected from nozzles of the printing head based on the printing data (element 12, column 2, lines 32-42).

With regards to claim 20, Oyen discloses means for completely printing an image in a predetermined area on the printing medium by moving a single movement of a single printing head relative to the printing medium while ink is being ejected from nozzles of the single printing head based on the printing data (element 12, column 2, lines 32-42).

With regards to claim 22, Oyen discloses control means for printing a detection pattern on a printing medium by using the printing head, for detecting the state of the nozzle (element 14, which performs the claimed functions as described on column 8, lines 38-49), and

detection means for detecting the abnormal nozzle based on the detection pattern printed on the printing medium (optical sensor disclosed on column 8, lines 45-49).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 4-6 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyen in view of Bland et al. (U.S. 6,278,469 B1).

Oyen discloses that the amount of ink deposited by the neighboring nozzles may be adjusted (column 6, lines 18-25).

Oyen does not expressly disclose adjusting the ratio added to each neighboring nozzle based on information regarding the landing position and diameter of the neighboring nozzle as obtained from a test print.

Bland et al. discloses performing a test print on print medium, determining the effect of dot placement errors and dot size errors, and adjusting the amount of ink deposited such that high quality nozzles deposit more ink than low quality nozzles (abstract). Further, Bland et al. teach that the technique may be applied to any ink jet printer (column 11, line 67).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the algorithm of Oyen to determine dot size and dot placement errors from the test print and to adjust the amount of data allocated to and ink deposited by the nozzles such that high quality nozzles print more ink than lower quality nozzles, as taught by Bland et al. The reason for doing such would have been to improve print quality without reducing throughput.

6. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyen in view of Su et al. (U.S. 5,929,875).

Oyen discloses that the distribution of print data to the neighboring nozzles may be determined based on the image intended to be printed (column 6, lines 18-25).

Oyen does not expressly disclose varying the manner of adding print data of the abnormal nozzle to the neighboring nozzle depending on type of print medium.

Su et al. teach adjusting the print mode of a printer based on the type of print medium (column 3, lines 22-24 and column 24, lines 12-18).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify Oyen to vary the manner in which print data of the abnormal nozzle is added to print data of the neighboring nozzle. The reason for doing such would have been to accommodate for different ink absorption properties of various media types (column 24, line 18).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian D. Huffman whose telephone number is (571) 272-2147. The examiner can normally be reached on 9:30a.m.-6:00p.m. Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JH
27 January 2005

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